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## TWO FORMS OF AGRICULTURAL MANAGEMENT IN THE TROPICS

By YOSHINOSUKE YAGI

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### 1

Tropical agriculture is marked by several characteristics of its own. Firstly, it produces not only annual crops but also perennial and permanent crops. Secondly, it requires the preparation of its crops on an extensive scale in connection with their transportation, preservation and storage. In the agriculture of tropical colonies, either the colonists and the natives together are in charge of a farm management, or the natives, as subordinate labourers, work for the colonists, who are in charge. Thus, there are two types or forms of management, which are opposed, and sharply different from, each other. The one is the plantation or estate which is managed by colonists and the other is the native agriculture or management undertaken by the natives who are the aborigines of the country. Whereas the plantation produces foodstuffs or industrial raw materials which are exported to the countries of the temperate zone and possesses a large tract of land in which an enormous amount of capital is invested; the native agriculture produces by domestic labour mainly the farm products which are necessary for daily living. For this reason, it may be said that, whereas the former is an enterprising management having profit-making as its object, the latter is a selfsufficient domestic management.

I shall now turn to the different conceptions of the plantation as held by scholars. Waibel defines the plantation as "the agricultural and industrial management which produces vegetable products for markets on a large scale by

using a vast amount of labour and capital and generally under the direction of Europeans." <sup>1)</sup> Rostock defines it as "an agricultural and industrial management which produces horticultural produce for the world market on a capitalistic basis." <sup>2)</sup> Professor Okuda defines it as "a large scale agricultural management, (1) having a large scale equipment for preparing vegetable crops, (2) the enterprisers employing as labourers foreign races who are inferior to themselves in point of culture, (3) and the sale of its products being made in the world market." <sup>3)</sup> Professor Negishi defines the plantation as "a large scale agricultural production which is undertaken by a capitalistic colonist with its own capital, technique and managing ability on a capitalistic basis for the world market, and which employs in the tropical colony either aborigines or imported workers under the directing authority for the reclamation, cultivation and gathering of the so-called colonial products or trade crops such as—aromatics (pepper, clove, cinnamon), medicine (quinine), table luxuries (coffee, cacao, tea, sugar, tobacco), raw materials (cotton, hemp, rubber, cocoa) etc." <sup>4)</sup>

It is clear from the above definitions that the plantation is (1) a large-scale agricultural management which is carried on in a tropical colony (2) its enterprisers who are the colonists undertaking it on the principle of profit-making (3) uniting the capital and managing ability of their own country with the labour power of the aborigines or of imported workers (4) under the directing authority (5) producing such materials as aromatics, medicines, table luxuries and other vegetable industrial materials, all of which are for the world market (6) possessing a large scale equipment for preparation. On the other hand, the native agriculture may be defined as

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1) Leo Waibel, *Probleme der Landwirtschaftsgeographie*, 1933, S. 22.

2) K. P. Rostock, *Das Standortproblem in der tropischen Plantagenwirtschaft* (Koloniale Rundschau, Jahrg. 1932, Heft 7-8) S. 211.

3) I. Okuda, *Agriculture in Java* (Journal of agricultural economics, Sept. 1939).

4) B. Negishi, *On the organization of plantation*, 1934, p. 55.

(1) small-scale management dependent on domestic labour (2) is a means of livelihood for their own (3) and for this reason aims chiefly at the production of self-sufficient food-stuffs (4), the cultivation of revenue crops being secondary in importance.

## 2

I shall compare the above two forms of agricultural management more in detail in order to elucidate their respective characteristics.

(I) Kinds of cultivated crops. The plantation produces only commodity crops which are for sale in the world market. Of these, (1) perennial crops are rubber, coffee, tea, oil coconut, agave, coconut, cacao, quinine, kapok, etc. (2) the principal annual crops are sugar cane, tobacco, volatile and fatty crops.

In the native agriculture, crops for daily life are mainly produced, and the commodity crops are chiefly for local markets. The agricultural products which are exported by the native farmers are mainly the remainder of what has been consumed for their domestic purposes. Of the various crops produced by the natives, (1) the principal annual ones are rice, the Indian corn, cassava, sweet potato, peanut, soy bean, other vegetables, tobacco, sugar cane, sesame, Cayenne pepper, castor, cotton, etc.; (2) the principal perennial crops are coconut, kapok, coffee, tea, cacao, pepper, nutmeg, clove, cinnamon, sago cocoa, rubber, etc.

Whether given crops are more suited to cultivation by the plantation or by native agriculture will be decided by the characteristics of the crops themselves as follows.

(1) The length of the period between planting and harvest. If the period between planting and harvest for some crops is long, the compensation for the investment made will be deferred to that extent, and the natives having only a small amount of capital would be unable to raise such crops. Thus, the cultivation of permanent crops is suited to the plantation.

(2) Labour demand required by crops cultivated. The plantation usually employs the labour power of many natives who are the aborigines of the colonized country or of imported workers. Consequently, the plantation is suited to the cultivation of crops that demand labour power constantly throughout the entire year. On the other hand, the plantation will have to employ highly paid workers for temporary purposes, in case it should cultivate the crops which demand for labour power a seasonal variation of activity, and for this reason such crops will prove unprofitable to the plantation. In the case of the native agriculture, which does not stand on the principle of profit-making as in the case of the plantation, it is capable of averaging its labour demand throughout the whole year by combining different crops, because it undertakes policulture which raises various crops, instead of monoculture as in the case of the plantation.

(3) The degree of preparation required of crops cultivated. Since the products cultivated in tropical agriculture are generally to be exported to the countries of the temperate zone, it is necessary for their producers to make preparation on their products in order to expand their preservability and thereby to enhance their commodity value, and also in order to abridge the cost of their transportation. Such tropical products as sugar cane, coffee, raw rubber, hemp, etc. are exported after their preparation. Thus, the native agriculture cannot cultivate the crops whose preparation requires a large-scale equipment and a big amount of capital. When the native farmers cultivate such crops, they must offer their products to the plantation having such an equipment.

What should be noted in this connection is the fact that the distinction between the crops suitable to the plantation and those suitable to the native agriculture is not permanently constant nor fatal. For the distinction between the two will gradually fade away, as the capital power of the native farmers is increased and their technique is improved.

(II) The cultivation methods of crops. As the plantation cultivates the crops for export purposes, in the great

majority of cases it usually undertakes monoculture which raises a single crop. This is because monoculture means the specialization of agriculture with its attendant high efficiency of producing commodities. On the other hand, the native agriculture being the means of livelihood instead of profit-making, produces various crops which are necessary for livelihood, and thus their method of cultivation is one of policulture. However, this distinction between the two forms of tropical agriculture viewed from the method of cultivation, is by no means rigorous. Some of the enterprisers of plantations are in recent years attempting to change to policulture, partly for the purpose of averaging their business profit and partly in order to assure the dispersion of risks.

Special mention should be made of the plantations in Java where not a small number of them conduct policulture. In Java various tropical crops can be cultivated because of several reasons. In the first place, its land is fertile and its topography is complex. Secondly, not only its climate is temperate, but the geographical distribution, its temperature and rainfall are highly varied, not only on the surface, but also in the depth. Thirdly, its population is very dense so that it is easy to secure the labour power of natives. Thus, it is easy for the plantations there to undertake policultural production. In Java, little over one half of the plantations are engaged in monoculture, and there is an extensive policulture which combines rubber with coffee, or rubber with tea, or quinine with tea. On the other hand, in regions such as Sumatra, Borneo and Celebes, the plantations are more specialized, more than 85 per cent of them being engaged in monoculture. Of the total of 1,212 plantations in these regions, 452 cultivate rubber, 430 copra, 40 tobacco, 38 coffee, 25 tea, 19 oil cocoa, 21 other crops of monoculture. These plantations in the East Indies tried to yield profits at the rates that they secured prior to 1920 by way of counteracting the violent fall in the prices of export farm products after that year by such means as the rationalization

of management, the reorganization of their spheres of cultivation, the large-scale reduction of labour wages and the intensification of management. At the same time, they tried to change for policulture in order to disperse their risks.

Whereas the plantation solely aims at market production, the native agriculture mainly cultivates the crops that are necessary for the lives of the natives and cultivate commodity crops only when there is room left for such crops. Thus, the plantations cultivate mainly quinine, pepper, oil cocoa, sisal, rubber, coffee, cacao, sugar cane and tea; while the native farmers cultivate rice, Indian corn, peanut, sesame, coconut, betel nut, bean, sweet potato, etc. These crops are raised by the native farmers in policulture and in rotation. For instance, in East Java where artificial irrigation is available, for paddies, paddy rice, sweet potato, Indian corn, paddy rice and miscellaneous crops are cultivated in rotation in the order named. In the field of East Java, the Indian corn and bean and the Indian corn and potato or bean are raised in rotation in the order given. Different methods are used in different localities.

(III) The scale and intensity of management. In comparing the area of management between the plantation and the native agriculture, it is found that, whereas the former produces export farm goods on a large scale by employing many native workers or imported workers, the latter mainly produces what the farmers need in their daily lives. It is clear then that the area of management is much larger in the case of the plantation than in the native agriculture. But the area of management for different plantations will vary according to the density of population and the fertility of land. The intensity of management is also determined by these factors. The same may be said of the native farming.

Take the case of Java for instance. Here land has been developed from early times and its population has been highly dense, and thus the European plantation enterprisers leased arable lands in open fields from the natives for the period



of 75 years, and they cultivated there sugar and tobacco. But they had to cultivate such permanent crops as quinine, tea and coffee in the highlands which the natives had not yet utilized. But in the case of such regions as Sumatra, Borneo and Celebes, their population being sparse and their lands available in great abundance, such a crop as oil coconut required a big amount of capital for oil refinery. And here appeared an industry which would prove unprofitable unless it possessed arable lands for more than 2,000 hectares. Because of such circumstances, whereas the average area of 1,169 plantations in Java is 883 hectares, that of 1,225 plantations in Sumatra, Borneo, and Celebes is 1,153 hectares, the latter being larger by 25 per cent. Again, because of the same circumstance, in Borneo, Sumatra and Celebes all of which are sparsely populated and which have lands in great abundance, the plantation enterprise attempts to utilize lands roughly in order to secure as high a rate of profit as possible for each labour unit; but in Java the plantation enterprisers justly endeavour to secure as high rate of profit as possible for each area unit, through their intensive utilization of lands.

The same may ally to the native farming. In the densely populated Java, the average area of paddies per farm house is only 0.87 hectare, that of field 0.57 hectare, and that of residential land 0.16 hectare, and thus their cultivation is on a very small scale. In Java, the farmers are constrained to make intensive use of lands and in consequence while the amount of yield per area unit is considerably large, that of labour unit is very low. On the contrary, in the case of Sumatra, Borneo and Celebes, their lands being in great abundance compared with populations, the area of management in the native agriculture is larger than that in Java, and even land-shifting agriculture by burning fields is carried on. In these regions, land being available in great abundance, the native farmers utilize it roughly and have leisure to cultivate commodity crops in addition to crops for their daily living. Thus, their yield per labour unit is higher

than that in Java.

(IV) The objects of management. Inasmuch as the plantation is defined as an institution in which its enterprisers combine the capital and managing ability of their own country with the labour power of the natives and produce export farm products according to the principle of profit-making, the object of its management is to secure as high a rate of profit as possible for the investment made. Thus, the enterprisers endeavour to secure profits by producing high class goods of unified qualities which are suited to the world market, by exploiting vast undeveloped lands by means of their superior technique and powerful capital, by making an enormous amount of investment in an equipment for preparation of products, and by employing many low-wage native labourers. The plantation endeavours to rationalize its management according to such a principle of profit-making and to improve the qualities of its products. It also makes efforts to apply new agricultural technique, to improve the kinds of farm crops and to introduce into its management advantageous new crops. The plantation cultivates at first those crops which are most profitable under the existing conditions of demand, but when these conditions of demand change, so long as the qualities of soil, the amount of rainfall and other conditions permit, it will plan out in order to change for more profitable crops. This is why it has been said that the key to the success of the plantation lies, not in the prevention of the price variations of its products, but in adapting the formation of production cost to the changes of price levels.

In the case of the native agriculture, its enterprisers have no intelligence nor capital, and they apply their domestic labour to a small area of land for the purpose of cultivating crops of daily necessity, and thereby make their living. For this reason, their farming is nothing but a means of livelihood. Moreover, although they are urged to cultivate commodity crops, their motive is not profit-making but the elevation of their living. Thus, the higher the living standard

of the natives, the more its solution is sought in more days of paid labour and in the eradication of the period in which their families have no work. This is brought about by the cultivation of crops convertible with gold and which can absorb a large amount of labour and by inserting other crops into the existing cultivation having an ample period of idleness between two periods of cultivation. The native agriculture often shows a considerable power of resistance against an economic panic, although its chief aim is to produce food for their own consumption. The natives in Sumatra, for instance, burn primeval forests in order to plant rice and as an intermediate crop they plant rubber trees which are left intact for several years until they can carry on tapping. This tapping is carried on with the assistance of workers who are given a share of tapped rubber and for this reason no cash is required for the production of rubber among the native farmers. In consequence, they would not have to stop rubber cultivation, even when the price of rubber has gone down. Even when the price of rubber has depreciated to the point that is unprofitable for the plantation enterprisers, the native cultivators of rubber continue their tapping, as they have their own means of livelihood by producing their own foodstuffs. It is because of all this that rubber cultivated by the native farmers, though inferior in quality, still proves a potent threat to the rubber cultivation by the European enterprisers.

(V) The maintenance of labour power. The plantation requires a large number of hired workers the majority of whom are aborigines of low living standard. Where native population is sparse and no great native labour is available, the plantation will have to import contract workers from other localities or other countries. Thus, it is necessary for the plantation to accomodate the required number of workers and let them work for it regularly. Regarding the necessity of labour power for the plantation, it is said that of all the factors which determine the plantation as an entirety, the accomodation of human labour power is by far the most

important.

The question as to how much labour power is required for a plantation will be determined by the degree of difficulty for land development, the size of the area of management and the kinds of crops cultivated. I shall eliminate from my discussion the amount of labour required for the original development of lands, as it is highly difficult to determine it because of their geological nature, their topography and the nature of the vegetation that covers them. As the cultivation of crops in the plantation is mainly carried on by human power and the possibility of its mechanization is very scanty, a comparatively large amount of labour is needed. For the cultivation of tobacco which is carried on by a most intensive labour power, 143 persons per hectare are required, for that of tea 112 persons, for that of rubber 65 and for that of oily crops 50 persons. Inasmuch as the natives of the tropical regions dislike to work beyond the necessity of maintaining their low standard of life, it is necessary to make them engage in work regularly. To do this, two methods are conceivable: first, to stimulate in them new desires and urge them to satisfy these desires by acquiring monetary wages on their own initiative; or, to institute a system of monetary taxation so as to make it unavoidable for them to earn a definite amount of wages. At any rate, it is necessary to accustom them to engage in work regularly.

In regions like Java which is densely populated, it is possible for the plantations there to get the supply of workers in the necessary number easily from the nearby villages. Moreover, because of the limited land and dense population, the natives in Java cannot make a decent living by cultivating their own lands and they get the opportunity of making up the deficiency of their living expenses by engaging in wage labour in the plantation. The workers of the plantations in Java are of two kinds: those who daily come to the plantations from their homes to work during the period of farming idleness and those who live in the houses offered

by the plantations within the plantation compound.

On the other hand, in the regions like Sumatra, Borneo and Celebes all of which are sparsely populated, it is necessary for the plantations there to import a large number of contract labourers (coolies) from Java, China and India. In consequence, the plantations in these regions must defray expenses for getting the supply of workers, for constructing their cottages and for their medical treatment. Thus, the labour cost in these regions is comparatively high. Since 1911 laws regarding the coolies have been passed and revised several times, for the double purposes of protecting the coolies and making them to engage in work regularly. These laws have provisions, on one hand, regarding the periods of labour contracts, working hours, wages, dwelling houses, free medical systems and the returning of coolies to their homes after the expiration of contracts; and on the other, concerning punishment for running-away in violation of contract terms.

There are two methods of paying wages to the workers of the plantations in Java; day-wages and payment by piece work. The former is adopted when careful work is required or the amount of work done is difficult of measurement; while the latter is adopted when the speedy completion of work is needed even at the sacrifice of bad workmanship, or when the amount of work done is comparatively easy of measurement. Thus, the system of payment by piece work is adopted for the picking of tea leaves, for the harvesting of agave and for the tapping of rubber. And to supervise the workers engaged in such piece work, the following officials in addition to the enterprisers are employed by the plantations: plantation manager, plantation head, district chiefs and assistants, etc.

In the case of native agriculture, hired labour is very seldom used because it is undertaken mainly by domestic labour. When workers are hired by native farmers, money wage is rarely paid and in the majority of cases wages in kind are paid. For instance, those workers who help the

farmers in planting and harvesting rice, get one-fifth of the rice crop as their wages. In the rubber plantations in Borneo and Sumatra, workers hired in the tapping of rubber are given one half of rubber sap tapped as wage in kind.

(VI) The acquisition of lands. The enterprisers of plantations need large tract of lands for their industrial undertakings. In the majority of cases, they purchase government lands. Let us take the example of French Indo-China. In this region, the plantation enterprise is conducted exclusively in the districts which are set aside as concession areas. By the concession is meant an area, the ownership of which is granted to a person who has purchased it from the government. It was instituted by a decree issued by the Governor of French Indo-China. According to this decree land below 300 hectares are given to small farmers free in order to encourage small farming. The land between 300 hectares and 1,000 hectares, those between 1,000 hectares and 4,000 hectares, and those above 4,000 hectares, are put on a public sale, according to regulations provided by the local prefect, the Governor and the President, respectively. After the sale has taken place, only those purchasers who actually develop the purchased land and who pass the inspection conducted by the government authorities are given the ownership of the land. The natives are not excluded by law from this system of concession, but in actual practice it is only Frenchmen and other Europeans that receive concessions.

The land law promulgated in the year 1870 for Java, Borneo, Sumatra and Celebes included all lands whose title had not been confirmed into government ownership, and these lands are to be subsequently concessioned to the enterprisers of plantations as estates for the period of 75 years. The maximum area of a single concession in Java is 500 bouws (one bouw is 0.7096 hectare) and that in Sumatra, Borneo and Celebes, 5,000 bouws.

Since all lands in the flat country of Java are occupied by the natives and in consequence there is no government

land for concession, the plantation enterprisers in that country lease the fields possessed by the natives for the purpose of cultivating tobacco and sugar. There is a legal limitation placed on such leases in order to protect the native agriculture: the area of land to be leased to the plantation enterprisers must not be more than one third of the entire area of native arable lands. The lands leased by the sugar and tobacco plantation companies are scattered over many villages and their cultivation is carried on in a three-year rotation. Thus, the native farmers must conform their own utility of lands to the plantation system, the result being that their self-development of agriculture is checked.

In the native agriculture, cultivation of lands is made on a small scale and there are two methods of cultivation: peasantry and similar methods and profit-sharing tenancy and other similar methods. Moreover, in a densely populated region like Java, the utility of residential areas is extensively made to cultivate kapok, coconut, betel nut, fruits, food crops, vegetables, etc.

(VII) Equipment for preparation. The commodity crops of tropical agriculture are generally shipped to the distant markets in the countries of the temperate zone, and in order to increase their preservability and transportability, it is necessary to make a certain degree of preparation on them. Because of differences in the nature of crops, some need only a simple preparation while others require a large-scale equipment for their preparation. For example, such crops as copra, pepper, betel nut, kapok, cassava and perfumed miscanthus need a very simple preparation, while oil coconut and sisal require a large-scale equipment. As the native farmers have no capital for installing a large-scale equipment, they are able to produce the former set of crops but are unable to produce the latter, which must be entrusted to the plantations. Moreover, preparation requiring careful operation and fine technique as well as an enormous capital and a large scale equipment for such processes as fermentation, crystalization, decolourization and desiccation, cannot

be expected of the native farming. Let us take the example of rubber production. Native rubber has no standardization in its quality, containing a high degree of water, and thus is not suited as an international commodity. For this reason, the refining factories of plantations purchase native rubber for preparation to make it a trade commodity. Moreover, although the native farmers can produce red sugar from sugar cane they are unable to produce white sugar from the same material, so that the sugar refineries of the plantations undertake the manufacturing of white sugar. For the production of tobacco, tea and cacao of excellent qualities, an equipment for fine fermentation will be needed and this cannot be expected of the native agriculture.

Thus, the plantations usually have a elaborate equipment for preparation of their products. It is because of all this that the plantation enterprise is called "the cultivation industry" ("Landbauindustrie"). And in consequence, the native farmers having no such equipment are in the position of the producers of raw materials and their relationship with the plantation enterprisers is one of subservience to them.

(VIII) The organization of management. The plantation differs from the native agriculture not only in respect to the extensiveness of the areas under its cultivation but also in respect to the organization of management. The plantation means the method of unified cultivation under a central direction. The chief characteristic of the plantation is found in the fact that the employers who are the enterprisers of the plantations employ hired workers in their lands and possess in their hand the directing authority over the enterprise. However, this is not limited to their own plantations. Even where farms are divided into many small parts, if they are controlled uniformly by the same directing authority—in other words, when the seeds planted, the time of planting and technical operations are unified by the same directing authority—then these small managements will lose their independence and therefore may be included in the category



of the plantation. Take, for instance, the sugar cultivation in the Fiji Islands. Since the cultivators of sugar there are perfectly under control of the agricultural advisers of the factors of plantations, the sugar cultivation is to be included in the category of the plantation. But where some big landlord lets many small portions of his land among a number of tenants for cultivation, as in the case of the coconut cultivation in the Philippines, the landlord collecting a portion of the products, it may be said that the management of cultivation is in the hands of the tenants. For this reason, such a form of cultivation belongs to the native farming rather than to the plantation.

Contrary to the plantation, in the farming of natives the heads of families direct their family members in the cultivation of their small lands.

### 3

I have so far compared and discussed the two forms of agricultural management, namely, the plantation and the native agriculture, and endeavoured to elucidate their respective characteristics and the differences obtaining between the two. Whereas the native agriculture is a small farm management undertaken by domestic labour, its object being chiefly to produce crops for their daily life; the plantation is a large-scale farm management undertaken by means of hired labour, its object being exclusively to cultivate commodity crops.

The following are some of the more important beneficial effects on the native agriculture of the development of the plantation in the tropical zone: (1) it gave the natives the opportunities for labour and of earning wages, thereby making their life somewhat easier than hitherto; (2) the plantation, having succeeded in the transplantation in the tropical regions of new crops by the application of their scientific knowledge of agriculture, has thereby stimulated the native farming to introduce these same new crops; (3)

by making improvements in seeds, methods of cultivation, use of fertilizers, etc., the plantation has shown a good example of agricultural management to the natives, and thereby promoted the improvement of the native agriculture.

On the other hand, the following are some of the bad effects of the plantation on the native agriculture: (1) since the plantations purchased government lands of extensive areas as estates, the natives were unable to secure new land for cultivation when their population has increased, and thus their life was oppressed by them; (2) as in the case of the flat lands of Java, the sugar companies and tobacco companies all of which were plantation enterprisers, leased arable lands from the native farmers for the cultivation of a three-year rotation, the native farmers also had to adopt a new method of utilizing their lands and this impeded their own independent development of management.

Our country today should attempt to maintain the self-sufficient supply of provisions and raw materials within the Greater East Asia Co-prosperity Sphere. Thus, those agricultural resources which are not sufficient for the existing demand should be expanded, while those which are produced in excess should be changed to other crops. It is clear, therefore, that an appropriate control should be exercised on the kinds and production output of agricultural products in the southern tropical regions. The Government should properly guide and control those engaged in agricultural production in these regions, especially in respect to the principles of management and the cultivation of crops so that they would be in harmony with the Great East Asia agricultural policy of Japan. It is because of the importance of such guidance and control that the study of the characteristic of the two types of management in the agricultural enterprise in the tropical region is of paramount importance.